



Microbotanical evidence for the spread of cereal use during the Mesolithic-Neolithic transition in the Southeastern Europe (Danube Gorges): Data from dental calculus analysis

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ABSTRACT

Research increasingly suggests that natural and social environments shaped the Neolithic expansion of the farming niche into Europe. The Danube Gorges, on account of its position between the Mediterranean and more temperate regions and the presence of archaeological sites with continuous Mesolithic and Neolithic layers of occupation associated with vast burial grounds is ideal for studying the modality of Neolithization. Previous dietary stable isotope (carbon, nitrogen, and sulphur) studies in the Central Balkan area indicate that many Neolithic humans remained reliant on foraged aquatic resources in the Gorges. Until now, there is no unambiguous evidence of cereal consumption in this region. The possibility that the rich aquatic resources of the Danube river habitats within Central Balkans influenced diet and thus delayed uptake of Neolithic cultigens is unanswered. The extensive skeletal record from sites in the Danube Gorges (Central Balkans) with its long temporal sequence, provides the opportunity to reconstruct plant use during Mesolithic and the Neolithic. To assess when cereals and possibly cultivated plants spread to the region, we analysed the microbotanical remains (starch grains and phytoliths) entrapped in the dental calculus of 81 individuals dating from 9100 to 5500 cal BC, recovered from five sites in the Danube Gorges. This study marks the largest study of dental calculus from this period so far conducted. Added to this, we present new radiocarbon dates ($n = 17$), bone collagen stable isotope data ($\delta^{13}\text{C}$ and $\delta^{15}\text{N}$; $n = 5$) and data on caries frequency. This dietary study identifies that the growing of crops commenced in the Early Neolithic circa 6000 cal BC and was brought by farming migrants of north-western Anatolian ancestry into the Danube Gorges. Despite bringing a Neolithic agro-pastoral subsistence practices and cultural novelties in the Gorges, these migrants and their descendants adopted some of the local dietary and cultural traditions, suggesting a mosaic pattern of Neolithization. The resulting data provides a better understanding of the tempo and spread of cereal agriculture practices and the role of cereals in the diet of Danube Gorges inhabitants.

1. Introduction

The Holocene transition from a hunter-gatherer lifestyle to agricultural food production was one of the most transformative adaptive shifts in human history (Zvelebil 2000; Bocquet-Appel 2011; Krauß 2011;

Özdoğan 2011a, b). This event has been designated the Neolithic Revolution (Childe 1936), during which social, cultural and biological changes transformed the trajectory of our species. Humans became the agents of ecological change and gained control over the reproduction and evolution of plants and animals gradually elaborating the farming

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